

In re: Duvick *et al.*
Appl. No. 09/882,694
Filed: 6/15/01
Page 9

REMARKS

Claims 1-33 are pending in the application. No new matter has been added by way of amendment. As requested by the Examiner, the claims have been amended to incorporate reference to particular SEQ ID NOs to specifically define the first and second nucleotide sequences of the claims. As requested by the Examiner, Applicants are submitting herewith copies of an alignment of second nucleotide sequences of the claims (SEQ ID NO:12 vs. SEQ ID NO:14) showing 41% sequence identity between the sequences and copies of an alignment of first nucleotide sequences of the claims (SEQ ID NO:16 vs. SEQ ID NO:28) showing 74% sequence identity between the sequences. Reexamination and reconsideration of the claims are respectfully requested.

The Invention

The invention relates to compositions and methods for detoxification or degradation of fumonisin or API. The enzymes and nucleotide sequences of the present invention provide a means for continued catabolism of the fumonisin-degradation products obtained by degradation with other enzymes, such as, for example, previously-described carboxylesterase and amine oxidase enzymes.

As suggested by the Examiner, Applicants have amended the claims so as to define all the nucleotide sequences of the claims in relation to particular sequences disclosed in the specification as SEQ ID NOs. However, Applicants reiterate that they believe that the claims as previously submitted described the invention so as to meet the enablement and written description requirements. The invention involves the use of the novel secondary nucleotide sequences in conjunction with enzymes having fumonisin esterase activity or amine oxidase activity such as those previously described and cited in the specification. Because the enzymes having fumonisin esterase activity or amine oxidase activity were previously described and known in the art, Applicants believe that the description of those sequences as previously claimed met the written description requirement. See, e.g., *Amgen, Inc. v. Hoechst Marion Roussel*, 314 F.3d 1313, 65 USPQ2d 1385 (Fed. Cir. 2003) (noting that the written description

In re: Duvick *et al.*
Appl. No. 09/882,694
Filed: 6/15/01
Page 10

requirement may be satisfied if the disclosed function is sufficiently correlated to a particular structure known in the art).

Nevertheless, in order to advance prosecution, Applicants have amended the claims as suggested by the Examiner. Applicants therefore respectfully submit that the claims meet the requirements for patentability and should be allowed.

Consideration Of Previously Submitted Information Disclosure Statement

It is noted that initialed copies of the PTO Forms 1449 that were submitted with Applicants' Information Disclosure Statement filed June 15, 2001 and December 11, 2002 have not been returned to Applicants' representative. **ACCORDINGLY, IT IS
RESPECTFULLY REQUESTED THAT AN INITIALED COPY OF THESE
FORMS 1449 BE FORWARDED TO THE UNDERSIGNED WITH THE
NEXT COMMUNICATION FROM THE PTO.** In order to facilitate review of the references by the Examiner, copies of the Information Disclosure Statement and the Forms 1449 are attached hereto. Applicants note that the IDS of June 15, 2001 has been included in mailings to the PTO *three times*. Copies of the cited references were provided at the time of filling the original Information Disclosure Statement, and, therefore, no additional copies of the references are submitted herewith. Applicants will be pleased to provide additional copies of the references upon the Examiner's request if it proves difficult to locate the original references.

CONCLUSION

In view of the above amendments and remarks, Applicants respectfully submit that this application is now in condition for allowance. Early notice to this effect is solicited.

If in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject Application, the Examiner is invited to call the undersigned.

It is not believed that extensions of time or fees for new addition of claims are required, beyond those, which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of

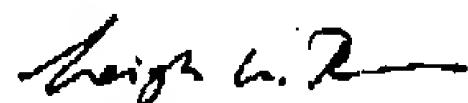
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In re: Duvick *et al.*
Appl. No. 09/882,694
Filed: 6/15/01
Page 11

this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for new addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



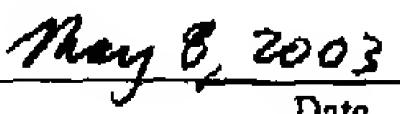
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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the US Patent and Trademark Office at facsimile number (703) 746-5249 on the date shown below.


Leigh W. Thorne


May 8, 2003

Date

Gap Results

GAP of: SEQ ID NO 14 check: 5189 from: 1 to: 1800
to: seq id 12 check: 79 from: 1 to: 1936
Symbol comparison table: nwgapdna.cmp CompCheck: 8760

Gap Weight: 50 Average Match: 10.000
 Length Weight: 3 Average Mismatch: 0.000
 Quality: 6541 Length: 1960
 Ratio: 3.634 Gaps: 10
 Percent Similarity: 40.541 Percent Identity: 40.541

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Match display thresholds for the alignment(s):  
| = IDENTITY  
: = 5  
. = 1
```

SEQ_ID_NO 14 x seq_id 12 May 6, 2003 15:05

1ACT 3
1 GCGGATCCGTTTTTTTTTCTAAGTTCCACTACCCACTTGCT 50
4 AGTGGATCATTGCATTGGCTGGCGACTGGCGGGATAGTCGTTGCGA 53
||| ||| ||| ||| ||| ||| ||| ||| |||
51 AGTCTCACAGTAGCTCCAAGGGTATAAGTTGACTCGAAGCTGCATCTCT 100
54 TGGTCGCGAGAATAAGCGTGCAGTGGAGGGATGTCAGATGGGGCCA 103
||| ||| ||| ||| ||| ||| ||| |||
101 CCGTGAAACATGGCAATAGTTTGTAGACAGATCCATCAACCGAGTACA 150
104 CGAGTATGTCGTGCGGGACCGTTGGACGCTCTGCATTGGCTTCA 153
||| ||| ||| ||| ||| ||| ||| |||
151 CGATGCCGTCAAGGTACATTCTCTCTGGCTCCTCACCTGCTTTGGGC 200
154 TCGGTTGCCGTGACTCTAGGGGAGCCTCCGCCACCGCGGCAACCGC 203
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
201 ATTGCTTTGGCTCACGATGGGGTCGTCTGCTCCTACTGTCAGATTGA 250
204 GACGGATTTCCGGTCCGCAGGACCGAT.....CTGGGCCAGGTTCA 245
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
251 TGCTGGATGGTGGTGGCACGACTACTGTCCTGGCACCACTGCGA 300
246 GGGACTGGCGGGACGTGAGCTTCGCGGAATACCCATGC....A 291
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
301 CCGTCAGCGAGTTCTGGCATTCTCTTGGCGCTCTCCGACACGGATTT 350
292 GCACCCCGGTGGCGGGCTGCGTTAGAAACCGCCCCAACACGCCCCGGC 341
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
351 GCACCTCCTACTCGTCCCCTACCTTGGTCACGGCTTGCAACGGCAACCGACTGC 400
342 CTGGACGGCGTTGGCGCCACCCAAATTGGCTCCGACTGCTCGAC 391

401 ATATGGTCCAGGATGCCCTAACAAATTCAATTACCCCGAAGAAACTCCGTG 450
 392CGGCCTATCTCGCAAAGGCAGCCTGCCCGGGCGTGAAGC 432
 451 AGATTACGATGGCCTGGTTCAATAACACCGCCCCGTCAGCTGGTAAAGT 500
 433 GAGGACTGTCTTACCTAACGTATGGCGCCGTCAGGGCTAAACCCGG 482
 501 GAGGACTGCCTGAACCTAACATCTACGTCC...CAGGAACTGAGAACAC 547
 463 CCAGTACCCCGTACGGTCTGGTCTACGGCGGCGGCTTCGCCCGGCGCA 532
 548 AAACAAAGCCGTACGGTTGGATATAACGGTGGAGCGCTGGAATATGGTT 597
 533 CGGCCAACCATGCCCTACTACGACGGCGAGGGCGCT...TGCACAGGGC 579
 598 GGAATTCAATTCCACCTTACGACGGGGCTAGTTCGCAGCCAATCAGGAT 647
 580 ATCGTCGTGGTGACGTTAACATCGAACATCCTGGGCTTTTCGC 629
 648 ATCATCGTCGTGACCATCAACTACACAAACGAAACATTCTGGGTTCCCTGC 697
 630 CCATCCTGGTCTCTCGCGCGAGAGGCCCCACCGGAACCTCGGGCAACTACG 679
 698 TGCCCGTCAGCT.....TCCAATAACACAGCGAAATCTGG 732
 680 GCCTACTCGACATTCCTCCCGCTCTCGGTGGTCCAGAGCAACGGCCCG 729
 733 GGTTCCCTAACCAAAGGTTGCTTGGATTGGTACAGCGGAACATCGCA 782
 730 GCCTTCGGAGGGGACCCCCCGCCGAGTGACGGTCTTGGTGAATCGGGCGG 779
 783 GCCTTTGGCGGTGATCCTCGAAAGGTACAAATATTGGCAAGAGTGGCGG 832
 780 AGCGAGGGCGATCGAACCTCTGCTCACCTCGCCGCTGAGCAAGGGTCTCT 829
 833 GGGCAGAAGTGTGACGTCTCTGACGTCTATGCCACACAACCCACCC 882
 830 TCCGTGGCGCTATCCTCGAAAGTCCAGGGCTGACCGACCGCTCGCGACG 879
 883 TCCGACCGAACATCGA...GTCGGTGTGGCTAACTACAAACTTCCCC 929
 880 CTCACCCACAGCGCCCGCTCGGGCGAGCGCCCTCGACGCCGATCTTCGG 929
 930 AAGGGAGATTGTCCGAACCTTGGAACACCACTGTTCAAGCTCTCAACTG 979
 930 ACTCGCGCTCAGACCGACCCAGCCACCCGTATGGCGCGCGCGACCGCGGG 979
 980 TACCAACCAAGTATCGACATCTGAGTTGTATGAGAAGAGTCGATCTCGCCA 1029
 980 GCCCGGCATCGCGGGACCTGGCGAGGGCGCTCCGACCGGACCGATCGTC 1029
 1030 CTCTGATGAAACACGATCGACACTCGGACTGGGTTGAGTACACGTTG 1079
 1030 GATGGCCATGTGCTGCCCGAGACCGACAGCGCGGGGATCGCGGGGGCA 1079

1080 GACAACGTAACCGTTGTGTACCGTTCTGAAACGGCTCGCACCGACTGGTGA 1129
 1080 GCTGGCCGCCGGTTCGGTCCTGATCGAACCAATGCCGACGAAGGCCCGCG 1129
 1130 CATTOCTCGTGTACCTGTTCTCGTCGGACGGTGGCAACCGGGACTTC 1179
 1130 CCTTCCTCGGGCGCCGCCGATGGAGACGCCAACCGGGACTACCCAGCCTAT 1179
 1180 TCTTTGTCTCGGGAGAATGACACCCAAAGCATATCTCGAGGAGGCAATC 1229
 1180 CTGGAGGGCGCACTTGGACCAAGCCGCCCGTGGCGCGTGTATCC 1229
 1230 CCGAATCAGGCCQACCTTACCAAGACTCTCCTTGGAGCATATCCCATTGG 1279
 1230 CCTCGACGCCGCCGCCAACGCCAAGGAAATGGTGGCGCATCTTCGGCG 1279
 1280 ATCCCCAGGGATCGGATCGCCTCAAGATCAGATTGCGGCCATTGAGACCG 1329
 1280 ACAATCAGTTCAATCGGGGCGTCTCGGCCTCTCGGAAGCGCTTGTGCGC 1329
 1330 AGGTAGATTCCAGTGTCCCTCTGCCATCGTGGCTCAGGACTCCCGGAAT 1379
 1330 CAGGGCGGCCCGTGGCGTTATCAGTTCAACGGTAATACCGAGGGTGG 1379
 1380 CGGGGTTATCCCTTCTTGGCGCTACTACTACAATGGACCTTGGAGAATCT 1429
 1380 AAQAGCGCCGGCTACCCACGGAGCGGAAATTCCCTACGTTTGGGGTGT 1429
 1430 CGAAGTTTCCCTGGGTCCGAAGTGTACCAAGCTCTGAAGTGGGGATGG 1479
 1430 TCAAGCTCGACGAGTTGGGTCTGTTGATTCGGGCCCGAGGGGCCACG 1479
 1480 T...GTTGGCACGTTATCCTGCGCAAGTGGACCGGCCCTTGGAGGCCAG 1526
 1480 CCCGCCGACCGTGGCTGGGCCAACTGATGTCCTCCACCTGGGTCC... 1525
 1527 ACGAGCAAATACATGCAGGGTGCCTGGCGGCCCTTGGCAAAAACCCCAT 1576
 1526 GGTTCGCCAAAGAATGGCGACCCCGCCGGGACGCCCTACCTGGCCTGCC 1575
 1577 GAATGGGCCTGGGTGGAAACAAAGTGGCAATGTCGGGGCGCTGGCTCAC 1626
 1576 TATTCTACGGGCAAGTCGACCATGACATTGCGTCCCCGAGGGCCGGGGC 1625
 1627 CAGGCAAAGCCATCCAGGGTGCAGTCTCTCCAGCGACAAATAGACCAACGA 1676
 1626 GGATGGGTGTGGCCCGGACCTCCATCCCCCTTGGCGC.GGATGGCGCCAAG 1674
 1677 TGTGCCTTGTACACGGATTATTATACTGAGTTGGGCACAATGGCGGCCAG 1726
 1675 GCGGGGTTACGCCGTCGACGATGGCGTGACGACGGTCGAAGGGATGTTCT 1724
 1727 GACATTTGAGGACCAAGGGTATTGTACCTACAGCGGGTTGGCAAAAGGAG 1776
 1725 CGATCTGGAGTCCGGCCGCCCTCGATTTGGCGTCTCCGGCGCTCAGAC 1774
 1777 GTATCTGCTGTCAATTGGCCGCCAGCCATCATTGAAGAGTGCTGAAATT 1826

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P. 014

Sequences are 16 (Exophiala) and 28 (Rhinocladiella)

414 + 50 = 464 divergent nucleotides in total
 seq 28 is 1803 nt long
 $1803 - 464 = 1339$
 $1339/1803 = 74.3\%$ identity over the full length of seq id 28.

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1 ATGGCACCTGCACCGAGCTACATCAATCCCCAAACCTCGCCTCCCCAGC 50
51 AGGGTATTCCCACCGTCGGCCTAGGCCAAACGGAGGGAGGTATGCCACAA 100
101 TAGCTGGACAGATTGGACAAAGACCGCTTCGGCCGTGACAGACCCCTGCCAC 150
151 GAGAACAGGTTGCCAAGCATTGCCAACCTGCGAGCTGTCTTGCTGC 200
201 AQTGGAGCCACTTCAAACGACATTACCAAGCTCAATTACTACATCGTCG 250
251 ACTACAACCCQACAAACTCACCGCAATTGGAGATGGCTCAAGGCTACC 300
301 TTTGCCCTTGACAGGCTCCCTCCTGCACGCTGGTACGCTGGGCCCT 350
351 GGCTTCACCTGAATACCCCTTGAAGGTTGATGCCACCGCTGGTTCCAG 400
1 ..... GACAACTTGGGACCGTGTAGTGGTGGCCCTGGC 36
401 GACACTCAACCCAGACAAATGTTGCCGACGTGGTGGTGGGCCCTGGC 450
37 TTGAGCAGTTGGAGACGGCACGGAAAAGTCCAGGGCCCGCTGTCTG 86
451 TTGAGCAGTTGGAGACGGCACGGAAAAGTCCAGGGCTGCCCGCTGTCTG 500
87 CCTCGTTCTTGAGGGGATCGATCGTGTAGGGGGAAAGACTCTGAGCGTAC 136
501 CCTCGTTCTTGAGGGGATCGTGTGGGGAAAGACTCTGAGCGTAC 550
137 AATCGGGTCCCGGCAAGGACGGACTATCAACGACCTCGGCCCTGGTGCATC 186
551 AATCGGGTCCCGGCAAGGACGGCTATCAATGACCTCGGCCCTGGTGCATC 600
187 AATGACAGCAACCAAAGCGAAGTATCCAGATTGGAAAGATTTCATT 236

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601 AATGACAGCAACCAAAAGCGAAGTATTCAAAATTAAATTGAAAGATTCAATT 650
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 701 QAAAGGCGAGCTCCAGAGGACGACCGGAAATTCAATCCATCAAGCACAAG 700
 751 ACGGTACAACCAACTACAGCTCCTTATGGTACTCCTGCTGAGCGAGGAG 336
 801 ACAGTACAACCAACTACAGCTCCTTATGGTATTCCCTGCTGAGCGAGGAG 750
 851 GTTCCAAGTCACTTACCGAACTCCTGGCGTATGCTCAGCTGATCGA 386
 901 GTTCCAAGTCACTTACCGAACTCCTGGCGTATGCTCAGCTGATCGA 800
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 1001 AGAGCATAGCTTCAGACACCCCAAGGGAGCCCTCAAGCGAACGCTCG 850
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 1101 ACAGTGTGAGCTTCAGACACTACTGTGAGAAGGATCTAAGCTTGCCTGCT 900
 1151 GTTCTCGGCGTAGCAAACCAAGATCACACCGCTCTGCTCGGTGTGGAAGC 536
 1201 GTTCTCGGCGTAGCAAACCAAGATCACACCGCTCTGCTCGGTGTGGAAGC 950
 1251 CCACGGAGATCAGCATGCTTTCTCACCGACTACATCAAGAGTGCCACCG 586
 1301 CCACGGAGATCAGCATGCTTTCTCACCGACTACATCAAGAGTGCCACCG 1000
 1351 GTCTCAGTAATAATTCTCGGAAAGAAAGACGGCGGGCAAGTATATGCGA 636
 1401 GTCTCAGTAATAATTCTCGGAAAGAAAGACGGCGGGCAAGTATATGCGA 1050
 1451 TGCAAAACAGGTATGCAGTCGATTGCCATGCCATGTCAAAAGAACTTGT 686
 1501 TGCAAAACAGGTATGCAGTCGATTGCCATGCCATGTCAAAAGAACTTGT 1100
 1551 TCCAGGCTCAGTGCACCTCAACACCCCCGTGAAATTGAGCAGTCGG 736
 1601 TCCAGGCTCAGTGCACCTCAACACCCCCGTGAAATTGAGCAGTCGG 1150
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 1701 CATCCGGCTGTACAGTACGGATCGCCCTCGGGCGGGGTGTTCCGAAAGCAAA 1200
 1751 AAGGTGGTGGTTCGTTACCGACAACTTGTATCCCACCTTGACATTTC 836
 1801 AAGGTGGTGGTTCGTTACCGACAACTTGTATCCCACCTTGATATTTC 1250
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 1901 ACCACCTCTCCCCCGAGAAGCAACGATGGCGGAAATCTATCCTGG 1300
 1951 GCTACTATAAGCAAGATAGTCTTCGTATGGGACAAGCCGTGGTGGCGCGAA 936

1301 GCTACTATAGCAAGATAGTCTCGTATGGACAAGCCGTGGCGCGAA 1350
937 CAAGGCTTCTCGGGCGTCCCTCCAATCGAGCTGTGACCCCATCTCATTTGC 986
1351 CAAGGCTTCTCGGGCGTCCCTCCAATCGAGCTGTGACCCCATCTCATTTGC 1400
987 CAGAGATACCAGCATCGACGTGATCGACAATGGTCATTACCTGTTCA 1036
1401 CAGAGATACCAGCATCGAAGTCGATCGGCAATGGTCATTACCTGTTCA 1450
1037 TGGTCGGAGACCCCGGGACCGGAAGTGGTCCCAACAGTCCAAGCAGGTACGA 1086
1451 TGGTCGGAGACCCCGGGACCGGAAGTGGTCCCAACAGTCCAAGCAGGTACGA 1500
1087 CAAAAGTCTGTCTGGGACCAACTCCCGCGAGCCTACGAGAACGCCGGGC 1136
1501 CAGAGATCTGTCTGGAACCCAGCTCCCGCGAGCCTACGAGAACGCCGGGGC 1550
1137 CCAAGTCCCAGAGCCGGCCAACGTGCTCGAATCGACTGGTCAAGCAGC 1186
1551 CCAAGTCCCAGAGCCGGCCAACGTGCTCGAATCGACTGGTCAAGCAGC 1600
1187 AGTATTCTCAAGGAACCGCCAGCGTCGCTATGGCTGAACGATCTCAAC 1236
1601 AGTATTCTCAAGGAACCGCCAGCGTCGCTATGGCTGAACGATCTCAAC 1650
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1651 AACTGGTTCCGGCGCTCAGAACGCCGTTCAAGGGTGGTCAATTGGTTGG 1700
1287 AACGGAGACGTCTTAACTTGGAAAGGGTATATGGAAAGGGCCATACGAT 1336
1701 AACGGAGACGTCTTGGTTGGAAAGGGTATATGGAAAGGGCCATACGAT 1750
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1751 CGGGTCAACCGAGGTGCTGCAGAACGGTGGCTAGCCTGGTCCAGCAAGCA 1800
1387 TAG 1389
1801 TAG 1803